

ABSTRACT

A fuel cell system including a housing defining an anode chamber and a cathode chamber and including a catalyst, a protonically conductive but electronically non-conductive membrane positioned between the anode chamber and the cathode chamber, a mixing chamber, a fuel chamber in fluid communication with the mixing chamber, and a first conduit having a first end connected to the anode chamber and a second end connected to the mixing chamber. The first conduit directs a fuel-water solution from the mixing chamber to the anode chamber. The system also includes a second conduit having a first end connected to the anode chamber and a second end connected to the mixing chamber, where the second conduit directs effluent from the anode chamber to the mixing chamber. A coalescing surface provided with at least one of said conduits collects effluent gas produced by said fuel cell.

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